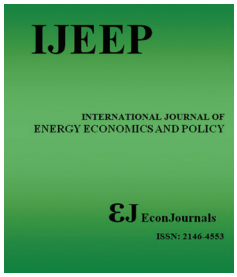

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The Impact of Perceived Value on Consumers' Positive Word-of-mouth Intention Toward Energy-efficient Appliances

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ABSTRACT

This study examines the dimensions of consumer perceived value that contribute to customer satisfaction and lead to positive word-of-mouth intention regarding energy-efficient appliances. An online questionnaire was administered to 351 consumers of energy-efficient appliances in Vietnam. Structural equation modeling results reveal that three consumer perceived values (functional value, environmental value, emotional value) have a positive impact on customer satisfaction, which in turn enhances consumers' positive word-of-mouth intention. Moreover, this study revealed that the relationship between emotional value and customer satisfaction, as well as the relationship between environmental value and customer satisfaction, differs significantly between individuals with higher education levels and low education levels. The research findings contribute to the existing knowledge on pro-environmental behavior and relationship marketing. They also provide significant insights for policymakers, manufacturers and retailers in the energy-efficient appliances sector to encourage consumers to recommend energy-efficient products.

Keywords: Customer satisfaction, Consumer behavior, Energy-efficient appliances, Perceived value, Word of mouth
JEL Classifications: M3, Q41, O10

1. INTRODUCTION

Consumer interest in energy-efficient household appliances has become a major focus for marketing researchers. These appliances utilize technological advancement and often come with innovative features that are not widely known (Baldini et al., 2018). Energy-efficient appliances help households save money and offer environmental and societal benefits by lowering carbon emissions through the use of less energy while providing the same level of service. According to Jamil et al. (2022), there is growing acknowledgment in the literature of the significance of households buying energy-efficient appliances due to their substantial contribution to greenhouse gas emissions. Existing literature extensively studied factors affecting consumer buying of energy-saving products (Hossain et al., 2022; Shukla et al., 2021). However, little attention has been paid to consumer behavior in the post-purchase stage. Compared to other research domains such as a green hotel or organic food, there is a paucity of research on consumers' post-purchase behavior of energy-efficient appliances (Elhoushy and Jang, 2023). Issock Issock et al. (2020) emphasized the importance of post-purchase behavior as sustainability can only be achieved when consumers sustain their pro-environmental behavior. Moreover, there is a limited number of studies that explored the contingent effects of demographic characteristics on the relationship between consumer's perceived value and post-purchase behavior (Luo et al., 2021).

Vietnam is a representative example of an emerging market, in which the consumption of energy by households plays a crucial part in the overall energy use. Energy consumption at the domestic level constitutes approximately 33% of the overall energy consumption, making it the second largest sector after the manufacturing sector (Tran et al., 2022). Thus, it is essential to promote the use of energy-efficient appliances among households in Vietnam. This

not only ensures national energy security and fulfills environmental commitments but also contributes to the achievement of the United Nation's Sustainable Development Goals. Li et al. (2021) suggested that consumer purchases of energy-efficient appliances can help achieve multiple sustainable development goals set by the United Nations. Previous studies on energy-saving behavior at the domestic level in Vietnam regarded consumer purchases of energy-efficient appliances and daily energy-saving actions as a single concept, limiting the understanding of this behavior (Le et al., 2023; Nguyen et al., 2022). Compared to curtailment behavior, consumer purchases of energy-saving products offer more potential for energy-saving (Oikonomou et al., 2009). Prior research conducted in Vietnam has primarily concentrated on investigating the factors that affect consumers' purchase decisions of energy-efficient products during the pre-purchase stage (Nguyen et al., 2016; 2017). Authors such as Ngoc and Khoa (2023) have studied customer loyalty toward energy-efficient appliances but their focus was limited to consumers' repurchase intention of energy-efficient appliances as a reflection of customer loyalty. As energy-efficient appliances are characterized by long lifespan and take a long time before replacement, the understanding of other dimensions of customer loyalty, such as positive word-of-mouth, is more valuable for scholars and practitioners, especially when Vietnamese consumers, under the influence of collectivistic culture, are likely to be influenced by others (Hofstede, 2001). Given that some features of energy-efficient appliances, such as their environmental benefits, are difficult to judge (Visser et al., 2018), consumers may look for recommendations from other consumers to reduce uncertainty in their purchases.

In response to the above research gaps, this study aims to examine the impact of consumer perceived values toward energy-efficient appliances on their positive word-of-mouth intention based on an integrated model of the cognitive appraisal theory of emotions and the consumer perceived value theory, which has been used to explain consumer post-purchase of energy-saving products in prior studies. In addition, this study also examines the mediating role of customer satisfaction, which enables an explanation of the indirect effects of consumer perceived value dimensions on positive word-of-mouth intention. Previous studies focused exclusively on green satisfaction which failed to provide a comprehensive view of the impact of multiple value dimensions on consumers (Issock Issock et al., 2020). Furthermore, given that education level may influence consumers' environmental knowledge and environmental attitude (Li and Cao, 2021; Nguyen et al., 2019), this study looks at the notable variations between educational levels in terms of the effect of consumer perceived value dimensions on customer satisfaction as well as the effect of customer satisfaction on positive word-of-mouth intention. The following research questions will be addressed:

RQ1: How do consumer perceived value dimensions (i.e., functional value, price value, environmental value, emotional value) foster customer satisfaction, which leads to positive word-of-mouth intention?

RQ2: Does customer satisfaction mediate the relationships between perceived value dimensions and positive word-of-mouth intention?

RQ3: Do the relationships between consumer perceived value dimensions and customer satisfaction, and between customer satisfaction and positive word-of-mouth intention vary, with education levels?

This study offers several theoretical contributions and managerial implications. First, it highlights the impact of a comprehensive model of perceived value dimensions on consumers' positive word-of-mouth intention, which has received scarce attention from previous scholars. Second, this research examines mediation and multigroup analysis to gain a better knowledge of the underlying mechanisms and boundary conditions of how perceived value dimensions and customer satisfaction impact the intention to engage in positive word-of-mouth communication. Third, the findings collectively help manufacturers, retailers and policymakers of energy-efficient appliances make decisions to strengthen customer loyalty toward energy-efficient appliances.

The rest of this paper is organized as follows. Section 2 presents the theoretical background and hypotheses. Sections 3 and 4 outline the research methodology and present the findings. Section 5 concludes the paper and discusses the implications for management and directions for future research.

2. LITERATURE REVIEW

2.1. Positive Word-of-Mouth Intention

Word-of-mouth can be broadly defined as consumers communicating about a product, service, or company without being influenced by commercial interests (Litvin et al., 2008). As a consumer-dominated marketing channel, word-of-mouth is considered by consumers as one of the most influential sources of information when making consumption choices, because it operates independently from the market (Huete-Alcocer, 2017). Positive word-of-mouth intention refers to an individual's attitude to engaging in favorable word-of-mouth with other consumers. It involves informal communication about products or services between those who have consumed these products or services and those who are interested in them (Jalilvand et al., 2017). Positive word-of-mouth intention is seen as the most desirable behavioral outcome of loyalty (Ferguson et al., 2006), as it presents opportunities for businesses to attract new customers and gain a competitive advantage (Huete-Alcocer, 2017).

2.2. The Cognitive Appraisal Theory of Emotions

Cognitive appraisal theory, proposed by Lazarus (1991), seeks to explain how individuals cope with stressful situations. In the context of marketing, Bagozzi et al. (1999) suggested that cognitive appraisal can be a useful framework for studying emotions. According to this theory, the underlying evaluation of a situation combines to elicit specific emotions, which in turn influence consumer behavior. Previous research has shown that perceived value is closely linked to cognitive appraisal. It leads to the emotive state of satisfaction (emotional response), which ultimately leads to behavioral intention (coping response) (Hur et al., 2013). When consumers perceive more value in a product, they are more likely to be satisfied, and satisfied consumers tend to develop stronger loyalty toward the product (Yang and Peterson, 2004). Expectancy-confirmation theory has also validated the link between perceived value and customer satisfaction (Bhattacherjee, 2001).

Extant literature employed the cognitive appraisal theory to explain consumers' repurchase intention of energy-efficient appliances (Luo et al., 2021). As positive word-of-mouth intention is also a desirable outcome of consumer satisfaction (De Matos and Rossi, 2008), this study will reveal the impact of consumer perceived value on their positive word-of-mouth intention through customer satisfaction.

2.3. Consumer Perceived Value Theory

Initial research conceptualized consumer perceived value as a unidimensional construct, reflecting a "cognitive trade-off perceptions of quality and sacrifice" (Dodds et al., 1991; Zeithaml, 1988). In the later stage of conceptual development, several researchers emphasized the relevance of affective or emotional dimension in addition to cognitive or economic aspects (Babin et al., 1994; Holbrook, 1996; Sheth et al., 1991). Over time, authors have challenged and improved the multidimensional concept of consumer perceived value by introducing values that are relevant to specific products and research contexts.

Sweeney and Soutar (2001) developed PERVAL scales, which are applied to durable goods, such as cars or home appliances. According to PERVAL, consumers can perceive the functional, price, social, and emotional value of the purchase of durable products. However, in the context of energy-efficient appliances, social value is considered irrelevant since these products are usually consumed privately (Zhang et al., 2020). The existing pro-environmental literature has added an environmental value when explaining consumer choices of eco-friendly offers (Koller et al., 2011). Given that an energy-efficient appliance is a durable good with environmentally friendly characteristics, previous studies incorporated environmental value into the perceived value dimensions of energy-efficient appliances (Issock Issock et al., 2020; Zhang et al., 2020).

Based on the cognitive appraisal of emotions theory and the consumer perceived value theory, this research proposes a perceived value – customer satisfaction – positive word-of-mouth intention framework. As mentioned previously, this research concentrates on four perceived value dimensions: functional value, price value, emotional value, and environmental value. The study also adds to the current literature by investigating the mediating effect of customer satisfaction. Figure 1 represents the proposed structural model for this study.

2.4. Functional Value

Functional value represents the perceived utility of a product in achieving its core functional or physical performance. The functional value of a product is typically derived from the specific characteristics or attributes of the product itself (Sweeney and Soutar, 2001). Zhang et al. (2020) postulated that consumers generally focus on quality and performance when evaluating household appliances, with quality encompassing aspects like stability, and performance including factors such as minimal machine noise and refrigeration effectiveness.

Previous research has yielded inconsistent findings regarding the effect of functional value on customer satisfaction (Issock Issock et al., 2020; Luo et al., 2021). However, as the energy-efficient appliance is a product of advanced technology, this study anticipates a positive impact of functional value on customer satisfaction. Therefore, the following hypothesis is developed:

H_1: Functional value is positively related to customer satisfaction.

2.5. Price Value

Price value refers to how satisfactory a product is, based on the monetary or non-monetary costs spent in acquiring it (Sweeney and Soutar, 2001). The price value of energy-efficient appliances is manifested by the electricity cost-saving advantages enjoyed by households upon buying energy-efficient household appliances (Zhang et al., 2020). Previous studies have highlighted consumers' perception of the economic value of energy-saving appliances can lead to a positive evaluation of such products (Zhang et al., 2020). Therefore, it can be safely assumed that when consumers can perceive the benefits of long-term cost savings from the consumption of energy-efficient appliances, they are more likely to develop customer satisfaction. The following hypothesis is developed:

H_2: Price value is positively related to customer satisfaction.

2.6. Environmental Value

Environmental value refers to the value that consumers derive from the perceived impacts on environmental and ecological issues and concerns (Koller et al., 2011). Compared to conventional household appliances, energy-efficient appliances offer the special nature of energy conservation and environmental protection (Zhang et al., 2020). Issock Issock et al. (2020) found a positive effect of environmental value on customer satisfaction with energy-efficient appliances. Thus, we develop the following hypothesis:

H_3: Environmental value is positively related to customer satisfaction.

2.7. Emotional Value

Emotional value refers to the perceived utility that consumers attribute to a product or service to stir up feelings or affective states (Sweeney and Soutar, 2001). Energy-saving appliances not only contribute to lower electricity costs and environmental benefits but also offer users an enhanced experience compared to conventional products. This is attributed to their advanced technology, resulting in feelings of satisfaction and convenience (Zhang et al., 2020). Previous research conducted by Luo et al. (2021) confirmed a positive shift in emotions resulting in customer satisfaction. Therefore, the following hypothesis is proposed:

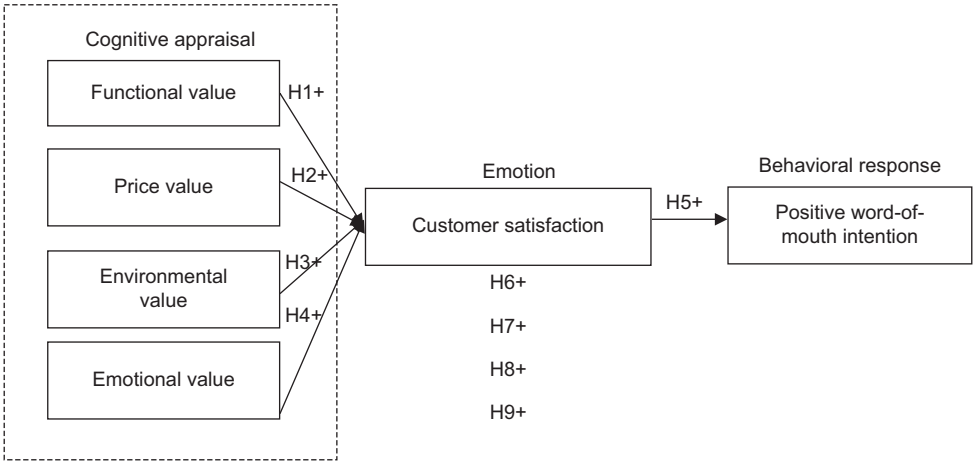
H_4: Emotional value is positively related to customer satisfaction.

2.8. Customer Satisfaction

Customer satisfaction is a consumer's post-purchase evaluation and affective response to the overall product or service experience (Oliver, 1980). Customer satisfaction is related to consumers' sentiment that consumption is delightful as product performance surpasses their expected needs (Roberts-Lombard and Petzer, 2018). Previous studies underlined a strong positive relationship between customer satisfaction and positive word-of-mouth (De Matos and Rossi, 2008; Issock Issock et al., 2020)

H_5: Customer satisfaction is positively related to positive word-of-mouth intention.

Figure 1: Research model



Source: Authors' suggestion

2.9. The Mediating Role of Customer Satisfaction

Based on the aforementioned arguments, this study stipulates that as consumers perceive values obtained from the consumption of energy-efficient appliances, they tend to develop customer satisfaction toward such products, which can be converted into a higher likelihood of recommendation intention. The following hypotheses are formulated:

H_6: Customer satisfaction positively mediates the relationship between functional value and positive word-of-mouth intention.

H_7: Customer satisfaction positively mediates the relationship between price value and positive word-of-mouth intention.

H_8: Customer satisfaction positively mediates the relationship between environmental value and positive word-of-mouth intention.

H_9: Customer satisfaction positively mediates the relationship between emotional value and positive word-of-mouth intention.

3. RESEARCH METHOD

3.1. Measures

A questionnaire was designed by forward and back-translating this instrument from English to Vietnamese and vice versa. All constructs and measurement scales were adopted from prior studies. Specifically, the consumption value constructs were adapted from studies by Zhang et al. (2020) and Issock Issock et al. (2020). In all, 13 items were used to measure the four consumption value dimensions in this study. Customer satisfaction was measured using five items from the works of Qiu et al. (2015), Gök et al. (2019), and Konuk (2019). Positive word-of-mouth intention was operationalized using three items by van Tonder et al. (2018) and Chen et al. (2014). To confirm the meaning and clarity of the questionnaire, a pre-test with 25 selected consumers of energy-efficient appliances was conducted. In this pre-test stage, slight modifications were made to items to make the measures clearer. All measurement items were assessed using a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). Table 1 presents all constructs and items in this study.

3.2. Sampling and Data Collection

In the absence of a sampling frame, data was collected through an online survey conducted in early 2022 by applying the convenient snowball sampling technique. Vietnam's population reached over 100 million people in 2022, of which more than two-thirds were active social media users. In particular, over 90% of Vietnamese Internet users used Facebook, making it the leading social media channel in the country (Statista, 2023). Thus, Facebook was used to reach and recruit participants due to its strongest presence in Vietnam. Snowball sampling is a referral technique that enables researchers to collect data by utilizing existing social connections. This sampling method involves initial respondents suggesting their friends and acquaintances to participate in the study. Through virtual snowball sampling on platforms like Facebook, researchers can connect with potential participants through interpersonal relationships (Nguyen and Hoang, 2023).

To ensure that participants were qualified, three filtering questions were used at the beginning of the survey. First, respondents were asked to indicate whether they were at least 18 years old. Second, they were asked to confirm they had purchased an energy-efficient appliance before. Furthermore, to be eligible to take part in the survey, respondents have to reside in Hanoi.

Hanoi was chosen as the particular research setting for two primary reasons. First, the residents of this city generally have higher incomes and are inclined toward adopting sustainable lifestyles (Nguyen et al., 2021). Second, Hanoi has the largest concentration of energy-saving product retailers (Statista, 2022), facilitating easier access to the desired research participants.

Respondents were recruited on a voluntary basis. To minimize the effect of social desirability bias, as suggested by Podsakoff et al. (2012), respondents' anonymity and confidentiality were assured, and it was emphasized that there were no right or wrong responses. In addition, to assess the presence of common method variance bias, we conducted Harman's single-factor test (Podsakoff et al., 2003). Since the first factor explained only 34.395% (<50% of the variance), it can be concluded the common method bias is not a significant concern in this study. A total of 351 valid responses (without missing values) were collected. Table 2 shows the demographic profile of the study's respondents.

Table 1: Measures of variables

Constructs	Items	Sources
Functional value	Energy-efficient appliances have advanced technology Energy-efficient appliances have good function Energy-efficient appliances have consistent quality Energy-efficient appliances are well made	Zhang et al. (2020) and Issock Issock et al. (2020)
Price value	Energy-efficient appliances are reasonably priced Energy-efficient appliances offer value for money Energy-efficient appliances are economical in the long run	Zhang et al. (2020) and Issock Issock et al. (2020)
Environmental value	The use of energy-efficient appliances contributes to the prevention of climate warming The use of energy-efficient appliances contributes to the reduction of environmental pollution Overall energy-efficient appliances are environment-friendly	Zhang et al. (2020) and Issock Issock et al. (2020)
Emotional value	I enjoy using energy-efficient appliances Using energy-efficient appliances makes me feel good Using energy-efficient appliances gives me pleasure	Zhang et al. (2020) and Issock Issock et al. (2020)
Customer satisfaction	I am satisfied with my decision to purchase energy-efficient appliances My choice to choose energy-efficient appliances is a wise one I am happy about my decision to purchase energy-efficient appliances I think I did the right thing in purchasing energy-efficient appliances Energy-efficient appliances exactly meet my needs	Konuk (2019), Qiu et al. (2015) and Gök et al. (2019)
Positive word-of-mouth intention	I would say positive things about energy-efficient appliances to other people I would recommend energy-efficient appliances to other people I would encourage my friends and relatives to purchase energy-efficient appliances	Chen et al. (2014) and van Tonder et al. (2018)

Table 2: Demographic profile of the respondents

Variable	Categories	Frequency (%)
Gender	Female	182 (51.9)
	Male	169 (48.1)
Age	18–29	101 (28.8)
	30–39	85 (24.2)
	40–49	59 (16.8)
	50–59	58 (16.5)
	>59	48 (13.7)
Marital status	Single/never married	76 (21.7)
	Married	224 (63.8)
	Widowed	24 (6.8)
	Divorced/separated	27 (7.7)
Education level	High school or lesser	40 (11.4)
	Professional degree	33 (9.4)
	College degree	69 (19.7)
	Undergraduate	162 (46.2)
	Postgraduate	47 (13.4)
Monthly income	Under VND 5,000,000	40 (11.4)
	VND 5,000,000–10,000,000	76 (21.7)
	VND 10,000,000–20,000,000	99 (28.2)
	VND 20,000,000–30,000,000	97 (27.6)
	>VND 30,000,000	39 (11.1)

Source: Results from data analysis

3.3. Data Analysis

This research follows quantitative approaches to analyze the data. Partial least square structural equation modeling (PLS-SEM) was chosen instead of covariance-based structural equation modeling (CB-SEM) for three main reasons. First, PLS-SEM is suitable for studies with a small sample size (Ringle et al., 2012). Second, PLS-SEM is particularly effective for research that aims to develop theories rather than confirm existing ones (Ringle et al., 2012). Given that this study is anchored on the cognitive appraisal theory of emotions of the consumer perceived value theory but tested the interrelationships between perceived value dimensions, customer satisfaction, and positive word-of-mouth intention which have not been examined in previous studies, it is considered theory expansion. Third, it may be more convenient to create a path model that includes a mediator (Hair et al., 2014).

This study followed the two-step approach suggested by Hair et al. (2019) for data analysis. First, the measurement model was assessed for the validity and reliability of the measures. Second, we evaluate the structural model through bootstrapping results to test the hypotheses.

4. RESEARCH RESULTS

4.1. Measurement Model

Based on Table 3 and Figure 2, the reliability analyses indicate that all Cronbach's alpha values were above 0.820. The composite reliability (CR) values ranged from 0.882 to 0.932, the factor loadings ranged from 0.772 to 0.890, and the average variance extracted (AVE) values ranged from 0.652 to 0.758 (Table 3). These values surpassed the recommended cutoff values of 0.70 for CR, 0.70 for factor loadings, and 0.50 for AVE, indicating satisfactory convergence validity (Hair et al., 2010).

The Fornell-Larcker criteria and Heterotrait-monotrait (HTMT) ratios were used to validate the discriminant validity of the current research. Using the Fornell-Larcker criteria, Table 4 confirms the discriminant validity as the values of square roots of AVE on the main diagonal surpassed the values of correlations between variables (Fornell and Larcker, 1981). Additionally, HTMT values were calculated and shown in Table 5. All HTMT values were less than the threshold of 0.85 (Henseler et al., 2015), providing additional evidence of the strong discriminant validity of the variables in this research.

The results of the structural model showed that the variance inflation factor values (VIFs) ranged from 1.594 to 2.695 which fell within the tolerance range of 0.20 and 5.0, indicating the absence of multicollinearity in this model (Hair et al., 2014).

Table 3: Construct reliability and validity

Constructs	Items	Outer loading	Cronbach's alpha	CR	AVE
Functional value	FV1	0.772	0.822	0.882	0.652
	FV2	0.834			
	FV3	0.787			
	FV4	0.834			
Price value	PV1	0.843	0.815	0.890	0.730
	PV2	0.857			
	PV3	0.862			
Environmental value	ENV1	0.849	0.818	0.891	0.732
	ENV2	0.869			
	ENV3	0.849			
Emotional value	EMO1	0.866	0.820	0.893	0.735
	EMO2	0.849			
	EMO3	0.857			
Customer satisfaction	SAT1	0.861	0.909	0.932	0.734
	SAT2	0.875			
	SAT3	0.869			
	SAT4	0.849			
	SAT5	0.828			
Positive word-of-mouth intention	WOM1	0.864	0.841	0.904	0.758
	WOM2	0.890			
	WOM3	0.857			

Source: Results from data analysis. AVE: Average variance extracted, CR: Composite reliability

Table 4: Fornell-larcker criterion

Constructs	EMO	ENV	FV	PV	SAT	WOM
EMO	0.857					
ENV	0.402	0.856				
FV	0.369	0.117	0.807			
PV	0.325	0.009	0.415	0.854		
SAT	0.415	0.358	0.381	0.243	0.857	
WOM	0.503	0.323	0.482	0.429	0.350	0.871

Source: Results from data analysis. Diagonal elements are the square root of the AVE for each construct. AVE: Average variance extracted

Table 5: Heterotrait-monotrait ratio

Constructs	EMO	ENV	FV	PV	SAT	WOM
EMO						
ENV	0.487					
FV	0.448	0.147				
PV	0.396	0.121	0.513			
SAT	0.478	0.413	0.437	0.281		
WOM	0.600	0.387	0.387	0.518	0.393	

Source: Results from data analysis

4.2. Structural Model

The bootstrapping results are illustrated in Figure 3. The significance of direct and indirect paths was established using the bootstrapping technique with 5000 subsamples. Table 6 lists the test outcomes of hypotheses intended for direct and indirect associations. Functional value was positively related to customer satisfaction ($\beta = 0.258$, $P < 0.001$), supporting H1. However, price value was not significantly related to customer satisfaction ($\beta = 0.044$, $P > 0.05$). Thus, H2 was rejected. Furthermore, environmental value was positively related to customer satisfaction ($\beta = 0.240$, $P < 0.001$), supporting H3. Moreover, emotional value was positively related to customer satisfaction ($\beta = 0.209$, $P < 0.001$), supporting H4. In addition, customer satisfaction was positively associated with positive word-of-mouth intention ($\beta = 0.350$, $P < 0.001$), supporting H5.

The R^2 values represent the predictive power of the model within the sample (Sarstedt et al., 2014). The findings presented in Table 7 demonstrate that functional value, environmental value, and emotional value collectively account for 27.3% of the variance in customer satisfaction. Furthermore, customer satisfaction explains 12.0% of the variation in positive word-of-mouth intention. The effect sizes f^2 are computed as the degree to which an exogenous variable contributes to the R^2 value of an endogenous variable. The results in Table 6 indicated that the variables in this study have small effect sizes, except for price value, which has no effect.

4.3. Mediation Analysis

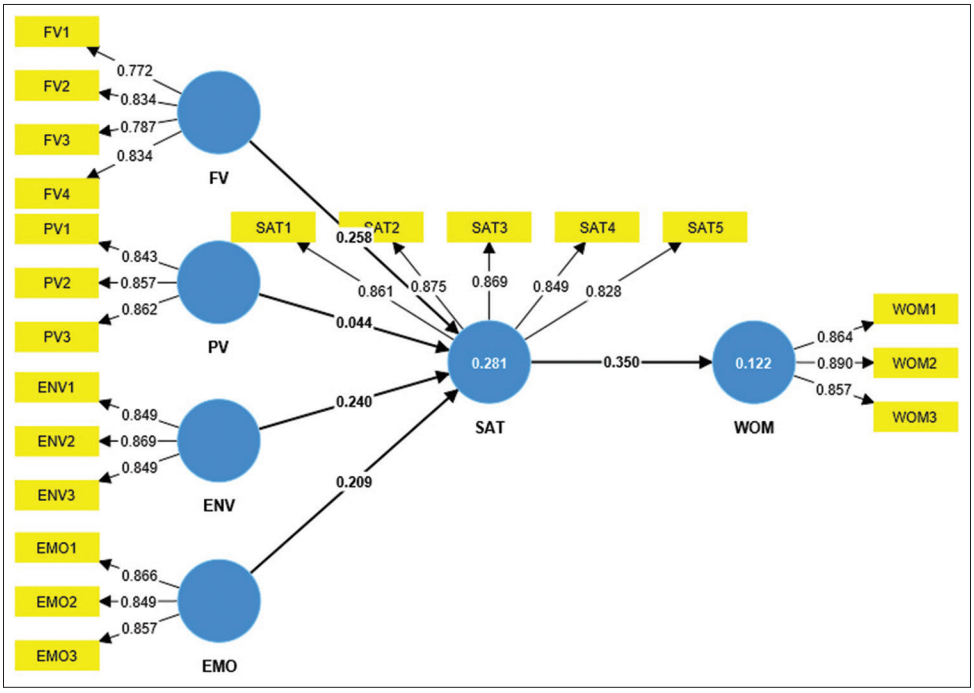
Results of bootstrap analysis with 5000 subsamples and 95% confidence intervals in Table 6 and Figure 3 show that the indirect effect of functional value on positive word-of-mouth intention through customer satisfaction was positively significant ($\beta = 0.090$, $P < 0.001$). Hence, H6 was supported. On the other hand, this study found an insignificant mediating effect of customer satisfaction on the relationship between price value and positive word-of-mouth intention ($\beta = 0.015$, $P > 0.05$). Thus, H7 was not supported. For H8 and H9, the results revealed that customer satisfaction significantly mediated the relationship between environmental value ($\beta = 0.084$, $P < 0.001$) and positive word-of-mouth intention as well as those between emotional value ($\beta = 0.073$, $P < 0.01$) and positive word-of-mouth intention.

4.4. Multigroup Analysis

The multigroup analysis (MGA) can be used to examine whether there are differences in hypothetical relationships among different groups. The overall sample was divided into two groups based on education level: the high education level group, which includes participants with tertiary degrees (university undergraduate; postgraduate), and the low education level group, which includes participants with no-tertiary degrees (High school or lesser; professional degree; college). Before performing the multigroup analysis, it is necessary to assess the measurement invariance of composite models (MICOM). This assessment involves three steps: (1) configuration invariance, (2) compositional invariance, and (3) the equality of composite mean values and variances (Henseler et al., 2016). The findings in Tables 8a and b show that full measurement invariance has been established and MGA should be used to compare the groups (Henseler et al., 2016).

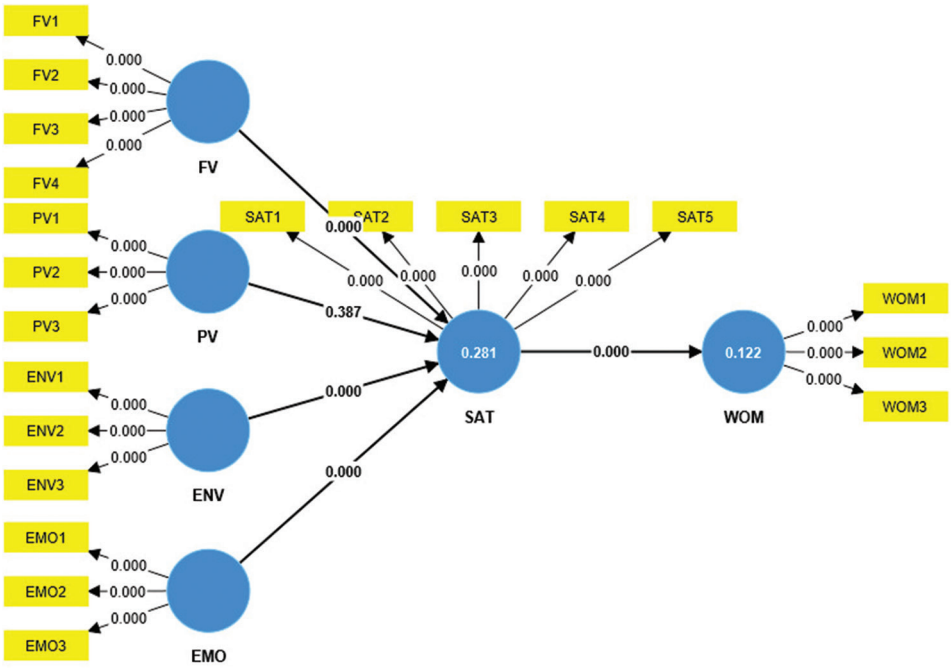
The results of MGA using Henseler's MGA (Henseler et al., 2016), as presented in Table 9, indicated that there are significant differences in p-values only for the impact of emotional value on satisfaction and the impact of environmental value on satisfaction. The impact of emotional value on satisfaction is smaller among research participants with tertiary degrees compared to participants without tertiary degrees. On the other hand, the impact of environmental value on satisfaction is higher among the group with tertiary degrees group compared to the group without tertiary degrees. Other paths do not show significant differences among the two groups.

Figure 2: The results of the measurement model



Source: Results from data analysis

Figure 3: The results of the structural model



Source: Results from data analysis

5. DISCUSSION AND CONCLUSION

5.1. Theoretical Implications

The main objective of this study was to clarify the underlying mechanism by which consumer perceived value dimensions impact positive word-of-mouth intention through customer satisfaction. Overall, this study contributes to the existing literature by expanding the cognitive appraisal theory of emotions to investigate consumers' recommendation intention in the context of energy-efficient appliance purchases from the perspective of consumer values. The research results constitute several theoretical contributions and implications.

This study affirms that functional value, environmental value, and emotional value play a significant role in shaping customer satisfaction toward energy-efficient appliances. This finding is in line with Luo et al. (2021) and Román-Augusto et al. (2022), who also highlighted the positive impact of functional, emotional,

Table 6: Hypotheses results

Hypothesis	Relationships	Path coefficient	P	T-statistics	Results	f^2
Direct effects						
H1	FV→SAT	0.258	0.000	5.154	Supported	0.071
H2	PV→SAT	0.044	0.387	0.864	Not supported	0.002
H3	ENV→SAT	0.240	0.000	4.511	Supported	0.067
H4	EMV→SAT	0.209	0.000	3.700	Supported	0.043
H5	SAT→WOM	0.350	0.000	7.548	Supported	0.139
Indirect effects						
H6	FV→SAT→WOM	0.090	0.000	3.786	Supported	
H7	PV→SAT→WOM	0.015	0.414	0.817	Not supported	
H8	ENV→SAT→WOM	0.084	0.000	3.708	Supported	
H9	EMV→SAT→WOM	0.073	0.001	3.247	Supported	

Source: Results from data analysis

Table 7: R^2 and adjusted R^2

Endogenous variable	R^2	Adjusted R^2
Customer satisfaction	0.281	0.273
Positive word-of-mouth intention	0.122	0.120

Source: Results from data analysis

and green value on customer satisfaction toward environmentally friendly products. Notably, functional value has the strongest influence on customer satisfaction, followed by environmental value and emotional value. In contrast to the initial hypothesis, price value does not have a significant effect on customer satisfaction. This result supports the earlier work by Issock Issock et al. (2020), who found that price value does not correlate with green customer satisfaction, suggesting that affordability alone is no longer sufficient for consumers. This could be due to the inclusion of environmental value, which diminishes the impact of price value on green customer satisfaction (Issock Issock et al., 2020). Another possible explanation is that Vietnamese consumers have witnessed a significant increase in electricity prices, which may make the cost savings from using energy-efficient appliances less apparent to them.

One key finding of this study is that customer satisfaction exerts a positive influence on positive word-of-mouth intention. This finding is consistent with earlier studies of Issock Issock et al. (2020) and Román-Augusto et al. (2022).

Another interesting research result is education level plays an important role in the cultivation of positive word-of-mouth. This is considered a novel finding because these relationships have not been studied previously, thus advancing our knowledge about the formation of positive word-of-mouth among different groups in the context of an emerging country. The impact of environmental value on customer satisfaction among those with higher education levels was significantly higher than that among those with lower education. This could be explained that consumers with higher education levels have better access to environmental education, resulting in strong sustainable attitudes (Nguyen et al., 2019). This finding also builds upon the previous works of Kreczmańska-Gigol and Gigol (2022) and Mills and Schleich (2012), which reported that consumers with higher education levels are more likely to save energy for environmental reasons. Conversely, consumers with lower education levels showed a greater concern for the emotional value derived from the purchase of energy-efficient appliances. One possibility is that consumers with lower education levels prioritize personal comfort over the surrounding environment.

Furthermore, our findings shed light on the mediating role of customer satisfaction in the link between consumer perceived value dimensions and positive word-of-mouth intention. This extends the previous work of Román-Augusto et al. (2022), who underlined that green perceived value can lead to green word-of-mouth.

5.2. Policy and Managerial Implications

Given the significant impact of functional value and environmental value on customer satisfaction toward energy-efficient appliances, policymakers and pro-environmental campaigners should leverage these findings. They should highlight the physical performance and environmental benefits of such appliances in communication campaigns to deliver a convincing and compelling message to the general public. Additionally, to enhance accessibility to energy-efficient appliances, policymakers can consider subsidizing energy-efficient appliances to address economic barriers and raise awareness of energy efficiency investment. This strategy has been adopted in other countries, such as China (Zeng et al., 2014).

This study also has implications for manufacturers and retailers of energy-efficient appliances. It informs marketers about the set of values consumers expect to fulfill when purchasing such appliances. As consumers prioritize functional value, manufacturers should continuously improve the quality of energy-efficient appliances. Retailers, on the other hand, should emphasize the remarkable features of these appliances.

Furthermore, consumers are increasingly conscious of their emotional needs and environmental impact when using energy-efficient appliances. Therefore, retailers should emphasize the comfort that consumers would experience from using these products, as well as the environmental contributions they can make. This study also validates the importance of encouraging consumers to spread positive word-of-mouth about energy-efficient appliances.

Satisfied consumers are more likely to recommend the products to others. Thus, retailers can take advantage of popular online platforms or social networking sites to facilitate interaction

Table 8a: Results of invariance measurement testing using permutation (Step 1 and Step 2)

Step 1		Step 2		
Construct	Configural invariance	Original correlation	5% quantile	Compositional invariance
EMO	Yes	1.000	0.994	Yes
ENV	Yes	0.995	0.992	Yes
FV	Yes	0.992	0.988	Yes
PV	Yes	1.000	0.977	Yes
SAT	Yes	1.000	0.999	Yes
WOM	Yes	0.998	0.997	Yes

Table 8b: Results of invariance measurement testing using permutation (Step 3)

	Equal mean assessment			Variance differences	Equal variance assessment		
Construct	Mean differences	CLs (mean)	Equal mean		CLs (variance)	Equal variance	Full measurement invariance established
EMO	−0.009	−0.223–0.216	Yes	0.079	−0.333–0.363	Yes	Yes
ENV	0.042	−0.203–0.205	Yes	0.056	−0.296–0.318	Yes	Yes
FV	−0.182	−0.215–0.221	Yes	0.303	−0.330–0.322	Yes	Yes
PV	−0.094	−0.218–0.215	Yes	-0.118	−0.285–0.295	Yes	Yes
SAT	−0.206	−0.229–0.216	Yes	0.091	−0.312–0.353	Yes	Yes
WOM	−0.144	−0.217–0.210	Yes	0.195	−0.319–0.307	Yes	Yes

Source: Results from data analysis

Table 9: Multigroup analysis results

Path	Path coefficient differences (high education level – low education level)	P (high education level group vs. low education level group)
EMO→SAT	−0.267	0.023*
ENV→SAT	0.307	0.004**
FV→SAT	−0.050	0.607
PV→SAT	0.082	0.439
SAT→WOM	0.042	0.668

*P<0.05, **P<0.01. Source: Results from data analysis

between consumers, creating more opportunities for positive word-of-mouth. For example, retailers can establish an online community where consumers can share their experiences of using energy-efficient appliances.

Additionally, considering the contingent effect of education level on the impact of consumer perceived values on positive word-of-mouth intention, customer segmentation strategies should be tailored accordingly. Strategies targeting consumers with high education levels should focus on communicating the environmental benefits of adopting energy-efficient technology, while strategies targeting consumers with low education levels should highlight the personal benefits of using such products.

5.3. Limitations and Future Research Directions

Several limitations of this study should be acknowledged and overcome in future research. First, a limitation of this study is its reliance on cross-sectional data, which may hinder the establishment of causal relationships between variables. This is a commonly encountered issue with cross-sectional data. To address this limitation, future research could consider gathering data at different periods. An option for future research is to conduct a longitudinal study, which would provide a deeper comprehension of the cause-and-effect relationships between variables over an extended period. Second, although not addressed in this paper, the dataset provides an opportunity to explore the influence of socio-demographic variables, such as the differences in perceived values between males and females. Third, future research could investigate possible variations in influencing factors and purchasing behavior between urban and rural households. It should be noted that the current study only gathered data from urban households in Hanoi.

Another line of research is to examine whether the proposed model holds for other pro-environmental behaviors, such as the consumption of green buses. Additionally, the relatively modest R-squared values for customer satisfaction and positive word-of-mouth intention indicate that the research model could benefit from the inclusion of additional variables. Future studies should consider improving the predictability of the research model by adding other variables, such as personal values, cultural values, or environmental knowledge.

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REFERENCES

Babin, B.J., Darden, W.R., Griffin, M. (1994), Work and/or fun: Measuring hedonic and utilitarian shopping value. The Journal of Consumer Research, 20(4), 644-656.

Bagozzi, R.P., Gopinath, M., Nyer, P.D. (1999), The role of emotions in marketing. Journal of the Academy of Marketing Science, 27(2), 184-206.

Baldini, M., Trivella, A., Wente, J.W. (2018), The impact of socioeconomic and behavioural factors for purchasing energy efficient household appliances: A case study for Denmark. Energy Policy, 120, 503-513.

Bhattacherjee, A. (2001), Understanding information systems continuance an expectation-confirmatiom model. MIS Quarterly, 25(3), 351-370.

Chen, K.K. (2014), Assessing the effects of customer innovativeness, environmental value and ecological lifestyles on residential solar

power systems install intention. Energy Policy, 67, 951-961.
Chen, Y.S., Lin, C.L., Chang, C.H. (2014), The influence of greenwash on green word-of-mouth (green WOM): The mediation effects of green perceived quality and green satisfaction. Quality and Quantity, 48(5), 2411-2425.
De Matos, C.A., Rossi, C.A.V. (2008), Word-of-mouth communications in marketing: A meta-analytic review of the antecedents and moderators. Journal of the Academy of Marketing Science, 36(4), 578-596.
Dodds, W.B., Monroe, K.B., Grewal, D. (1991), Effects of price, brand, and store information on buyers' product evaluations. Journal of Marketing Research, 28(3), 307-319.
Elhoushy, S., Jang, S. (2023), How to maintain sustainable consumer behaviours: A systematic review and future research agenda. International Journal of Consumer Studies, 47, 2181-2211.
Ferguson, R.J., Paulin, M., Leiriao, E. (2006), Loyalty and positive word-of-mouth: Patients and hospital personnel as advocates of a customer-centric health care organization. Health Marketing Quarterly, 23(3), 59-77.
Fornell, C., Larcker, D. (1981), Structural equation models with unobservable and measurement error. Journal of Marketing Research, 18(1), 39-50.
Gök, O., Ersoy, P., Börühan, G. (2019), The effect of user manual quality on customer satisfaction: The mediating effect of perceived product quality. Journal of Product and Brand Management, 28(4), 475-488.
Hair, J., Sarstedt, M., Hopkins, L., Kuppelwieser, V.G. (2014), Partial least squares structural equation modeling (PLS-SEM). European Business Review, 26(2), 106-121.
Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. (2010), Multivariate Data Analysis: A Global Perspective. 7th ed. New Jersey: Pearson Prentice Hall.
Hair, J.F., Risher, J.J., Sarstedt, M., Ringle, C.M. (2019), When to use and how to report the results of PLS-SEM. European Business Review, 31(1), 2-24.
Henseler, J., Ringle, C.M., Sarstedt, M. (2015), A new criterion for assessing discriminant validity in variance-based structural equation modeling. Journal of the Academy of Marketing Science, 43(1), 115-135.
Henseler, J., Ringle, C. M., Sarstedt, M. (2016), Testing measurement invariance of composites using partial least squares. International Marketing Review, 33(3), 405-431.
Hofstede, G. (2001), Culture's Consequences: Comparing Values, Behaviors, Institutions, and Organizations Across Nations. United States: Sage Publications.
Holbrook, M.B. (1996), Customer value a framework for analysis and research. Advances in Consumer Research, 23, 138-142.
Hossain, I., Nekmahmud, M., Fekete-Farkas, M. (2022), How do environmental knowledge, eco-label knowledge, and green trust impact consumers' pro-environmental behaviour for energy-efficient household appliances? Sustainability, 14(11), 14116513.
Huete-Alcocer, N. (2017), A literature review of word of mouth and electronic word of mouth: Implications for consumer behavior. Frontiers in Psychology, 8, 1256.
Hur, W.M., Kim, Y., Park, K. (2013), Assessing the effects of perceived value and satisfaction on customer loyalty: A "green" perspective. Corporate Social Responsibility and Environmental Management, 20(3), 146-156.
Issock Issock, P.B., Mpinganjira, M., Roberts-Lombard, M. (2020), Modelling green customer loyalty and positive word of mouth. International Journal of Emerging Markets, 15(3), 405-426.
Jalilvand, M.R., Salimipour, S., Elyasi, M., Mohammadi, M. (2017), Factors influencing word of mouth behaviour in the restaurant industry. Marketing Intelligence and Planning, 35(1), 81-110.
Jamil, K., Dunnan, L., Awan, F.H., Jabeen, G., Gul, R.F., Idrees, M., Mingguang, L. (2022), Antecedents of consumer's purchase intention towards energy-efficient home appliances: An agenda of energy efficiency in the post COVID-19 era. Frontiers in Energy Research, 10, 863127.
Koller, M., Floh, A., Zauner, A. (2011), Further insights into perceived value and consumer loyalty: A "Green" perspective. Psychology and Marketing, 28(12), 1154-1176.
Konuk, F.A. (2019), The influence of perceived food quality, price fairness, perceived value and satisfaction on customers' revisit and word-of-mouth intentions towards organic food restaurants. Journal of Retailing and Consumer Services, 50, 103-110.
Kreczmańska-Gigol, K., Gigol, T. (2022), The impact of consumers' green skepticism on the purchase of energy-efficient and environmentally friendly products. Energies, 15(6), 2077.
Lazarus, R.S. (1991), Progress on a cognitive-motivational-relational theory of emotion. American Psychologist, 46(8), 819-834.
Le, T.D.H., Khuu, N.H., Hoang, T.H.L. (2023), Factors affecting energy-saving intentions among youth in Vietnam. International Journal of Energy Economics and Policy, 13(6), 603-609.
Li, X., Zhang, D., Zhang, T., Ji, Q., Lucey, B. (2021), Awareness, energy consumption and pro-environmental choices of Chinese households. Journal of Cleaner Production, 279, 123734.
Li, Z., Cao, X. (2021), Effectiveness of China's labeling and incentive programs for household energy conservation and policy implications. Sustainability, 13(4), 1-17.
Litvin, S.W., Goldsmith, R.E., Pan, B. (2008), Electronic word-of-mouth in hospitality and tourism management. Tourism Management, 29(3), 458-468.
Luo, B., Li, L., Sun, Y. (2021), Understanding the influence of consumers' perceived value on energy-saving products purchase intention. Frontiers in Psychology, 12, 640376.
Mills, B., Schleich, J. (2012), Residential energy-efficient technology adoption, energy conservation, knowledge, and attitudes: An analysis of European countries. Energy Policy, 49, 616-628.
Ngoc, L.B., Khoa, N.B. (2023), Research on customer loyalty towards energy-efficient household appliances in Hanoi. Journal of International Economics and Management, 158, 40-57.
Nguyen, H.V., Nguyen, N., Nguyen, B.K., Greenland, S. (2021), Sustainable food consumption: Investigating organic meat purchase intention by Vietnamese consumers. Sustainability, 13(2), 13020953.
Nguyen, N., Greenland, S., Lobo, A., Nguyen, H.V. (2019), Demographics of sustainable technology consumption in an emerging market: The significance of education to energy efficient appliance adoption. Social Responsibility Journal, 15(6), 803-818.
Nguyen, Q.N., Hoang, T.H.L., Mai, V.N. (2022), Applying the theory of planned behavior to analyze household energy-saving behavior. International Journal of Energy Economics and Policy, 12(5), 287-293.
Nguyen, T.H.Y., Hoang, P.D. (2023), The formation of attitudes and intention towards green purchase: An analysis of internal and external mechanisms. Cogent Business and Management, 10(1), 2192844.
Nguyen, T.N., Lobo, A., Greenland, S. (2016), Pro-environmental purchase behaviour: The role of consumers' biospheric values. Journal of Retailing and Consumer Services, 33, 98-108.
Nguyen, T.N., Lobo, A., Greenland, S. (2017), The influence of Vietnamese consumers' altruistic values on their purchase of energy efficient appliances. Asia Pacific Journal of Marketing and Logistics, 29(4), 759-777.
Oikonomou, V., Becchis, F., Steg, L., Russolillo, D. (2009), Energy saving and energy efficiency concepts for policy making. Energy Policy, 37(11), 4787-4796.

Oliver, R.L. (1980), A cognitive model of the antecedents and consequences of satisfaction decisions. Journal of Marketing Research, 17(4), 460-469.

Podsakoff, P.M., MacKenzie, S.B., Lee, J.Y., Podsakoff, N.P. (2003), Common method biases in behavioral research: A critical review of the literature and recommended remedies. Journal of Applied Psychology, 88(5), 879-903.

Podsakoff, P.M., MacKenzie, S.B., Podsakoff, N.P. (2012), Sources of method bias in social science research and recommendations on how to control it. Annual Review of Psychology, 63, 539-569.

Qiu, H., Ye, B.H., Bai, B., Wang, W.H. (2015), Do the roles of switching barriers on customer loyalty vary for different types of hotels? International Journal of Hospitality Management, 46, 89-98.

Ringle, C.M., Sarstedt, M., Straub, D.M. (2012), Editor's comments: A critical look at the use of PLS-SEM in "MIS Quarterly." MIS Quarterly, 36(1), 41410402.

Roberts-Lombard, M., Petzer, D.J. (2018), Customer satisfaction/delight and behavioural intentions of cell phone network customers - an emerging market perspective. European Business Review, 30(4), 427-445.

Román-Augusto, J.A., Garrido-Lecca-Vera, C., Lodeiros-Zubiria, M.L., Mauricio-Andia, M. (2022), Green Marketing: Drivers in the process of buying green products-the role of green satisfaction, green trust, green WOM and green perceived value. Sustainability, 14(17), 141710580.

Sarstedt, M., Ringle, C.M., Henseler, J., Hair, J.F. (2014), On the emancipation of PLS-SEM: A commentary on rigdon (2012). Long Range Planning, 47(3), 154-160.

Sheth, J.N., Newman, B.I., Gross, B.N. (1991), Why we buy what we buy: A theory of consumption value. Journal of Business Research, 22, 159-170.

Shukla, P., Paul, D., Malik, S., Mishra, D.K. (2021), The role of green marketing in energy conservation in the domestic sector. International Journal of Energy Economics and Policy, 11(1), 263-269.

Statista. (2022), Vietnam Retail Statistics 2022. Available from: https://www.statista.com/statistics/1233340/vietnam-number-of-electronic-stores-by-city/?fbclid=IwAR1iT4uvoGqHTXSNqdFeoBBTVEqhL5YpcnTDZvpdy33Oxy300VIz7gdsnyY [Last accessed on 2023 Dec 27].

Statista. (2023), Social Media in Vietnam - Statistics & Facts. Available from: https://www.statista.com/topics/8182/social-media-in-vietnam/#topicoverview [Last accessed on 2023 Dec 27].

Sweeney, J.C., Soutar, G.N. (2001), Consumer perceived value: The development of a multiple item scale. Journal of Retailing, 77(2), 203-220.

Tran, L.N., Xuan, J., Nakagami, H., Kuroki, S., Ge, J., Gao, W. (2022), Influence of household factors on energy use in Vietnam based on path analysis. Journal of Building Engineering, 57, 104834.

van Tonder, E., Petzer, D.J., van Vuuren, N., De Beer, L.T. (2018), Perceived value, relationship quality and positive WOM intention in banking. International Journal of Bank Marketing, 36(7), 1347-1366.

Visser, M., Schoormans, J., Vogtländer, J. (2018), Consumer buying behaviour of sustainable vacuum cleaners - consequences for design and marketing. Journal of Cleaner Production, 195, 664-673.

Yang, Z., Peterson, R.T. (2004), Customer perceived value, satisfaction, and loyalty: The role of switching costs. Psychology and Marketing, 21(10), 799-822.

Zeithaml, V.A. (1988), Consumer perceptions of price, quality, and value: A means-end model and synthesis of evidence. Journal of Marketing, 52(3), 2-22.

Zeng, L., Yu, Y., Li, J. (2014), China's promoting energy-efficient products for the benefit of the people program in 2012: Results and analysis of the consumer impact study. Applied Energy, 133, 22-32.

Zhang, Y., Xiao, C., Zhou, G. (2020), Willingness to pay a price premium for energy-saving appliances: Role of perceived value and energy efficiency labeling. Journal of Cleaner Production, 242, 118555.